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Effects of Collaboration and Exercise Type on Incidental Vocabulary Learning: Evidence against Involvement Load Hypothesis

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Abstract

This study examined effects of both collaboration and exercise type on learning vocabulary. Twenty seven Iranian learners of English received meaning and illustrative examples of the new target words through mini-dictionaries prepared for the study and practiced them both individually and collaboratively through two types of exercise: writing original sentence and a two-fill-in-the-blank. Their retention of the vocabulary was tested using vocabulary knowledge scale (VKS; Paribakht & Wesche, 1997). Data were analyzed using repeated measure ANOVA. Result showed that contrary to Involvement Load Hypothesis (Hulstijn and Laufer,2001), when time is held constant, exercise type does not make any significant difference in vocabulary retention. Result also showed that effect of collaboration depends on the exercise type.

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Keywords: Collobaration; Involvement Load Hypothesis; Incidental Vocabulary Learning

1. Introduction

Importance of vocabulary knowledge in SLA is known for all (Hayanes & Baker, 1993; Hincks, 2003; Joe, 1998; Ellis, 1994; Laufer & Nation, 1995, 2006; Schmit, 2000, 2008; Barcroft, 2004; Nation 2000). However the best way for learning vocabulary is still unknown, because it depends on many factors (de Groot, 2006). One of the factors

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known to be effective in vocabulary learning is the degree of engagement with it which is known as Involvement Load Hypothesis (Hulstijn & Laufer, 2001) in the literature. This hypothesis states that degree of involvement with a word determines its degree of irretrievability; the more the involvement, the more the chance of retention. Under this hypothesis, a task such as sentence writing would lead to higher vocabulary retention than cloze or fill-in-the-blank tasks because of higher degree of involvement. A few studies have so far provided empirical evidence for involvement load hypothesis (Laufer & Hulstijn, 2001; Laufer, 2005; Keating, 2008). However the idea was challenged by Folse (2006). He found out that exercises with varying degree of involvement load can be equally effective when time spent on them is equal.

Another factor which under the influence of Vygotsky's sociocultural view has received many attentions from researchers is the role of interaction and collaboration in language learning. Comparative effects of collaborative and individual performance of different tasks have been studied by many researchers (Aljaafreh & Lantolf, 1994; Donato, 1994; Nassaji & Swain, 2000; Swain, 2005; Nassaji & Tian, 2010; Storch, 1998, 2005. 2007; Kuiken & Vedder, 2002, among many others). However the issue is still controversial; some studies have shown that collaborative performance of tasks is more effective than their individual performance (Kowal & Swain, 1994; Nabei, 1996;) and others have shown no significant difference(Nassaji &Tian, 2010; Storch, 2005, 2007; Kuiken & Vedder, 2002). Therefore further research is required.

Regarding the abovementioned points the goal of this study is twofold: First, to test involvement load hypothesis using two types of written exercise with varying degree of involvement load while keeping performance time constant over the exercises; Second, to examine effect of collaboration (pair performance) in different exercise types.

2. Review of literature

Due to the key role that vocabulary plays in acquisition of a language, a great deal of SLA research has been devoted to it (Beglar & Hunt, 1999; Laufer & Hill, 2000; McCarthy, 1998; Mc Carthy & Carter, 1997, 2003; Nation & Wang, 1999; Moir & Nation, 2002;Nesi, 1999, 2000; Read, 1998, 2004; Singleton, 1999; Ward, 1999; Folse, 2006; Hulstijn and Laufer, 2001; Newton, 2001; Paribakht & Wesche, 1996,1997, 2000; Nation & Waring, 2004; Newton, 1995, 2001; Barcraft, 2001, 2002, 2007, among many others). Importance of vocabulary in different aspects of language learning is investigated. Some research (Laufer, 1989; Hu & Nation, 2000; Carver, 1994; Nation, 2006) has been carried out to determine the percentage of the vocabulary size required for operating in various spoken and written discourse and in different situations such as daily conversation, interviews and etc. Nation (2006), for instance, based on British National Corpus rate of 98% coverage, pointed out that one needs to know 8000-9000 word families in order to be able to read authentic texts such as novels or newspapers. Another area on which researchers have focused is the effects that a word form can have on its learning. While much of attention has been given to meaning of a word, research shows that word form can be equally important (Laufer, 1988; Bensoussan & Laufer, 1984; Grainger & Dijkstra, 1992; Groot, 2006). Laufer (1988) found out that words which have small differences in form such as difference in suffixes, or a vowel are difficult for learners to learn. Groot(2006) points out that L2 words that are orthographically and phonologically the same as L1 words are easy to learn and remember. Research has also studied effects of L1 on L2 vocabulary learning (Hemchua & Schmitt,2006; Hall,2006; Prince 1996; Lotto & Groot,1998;). Hemchua & Schmitt (2006) through tracing the lexical errors in Thai EFL compositions found that about one fourth of errors are due to L1. Lotto & Groot(1998) realized that L1-L2 pairs led to better learning than L2-picture pairs. Hall (2002) believed that initial form-meaning link involves attaching new form to the L1 representation.

Based on socio-cultural view of Vygotsky(1978, 1986), social interaction and collaboration play important role in learning. In fact, learning is a social activity which cannot be achieved its potential without interaction and collaboration with more capable peers. This is clearly indicated in his definition of ZPD. It is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable

peers"(Vygotsky, 1978,p. 86). Many studies have so far studied effects of collaboration on performance of different tasks (Nassaji & Tian, 2010; Storch, 1998, 2005, 2007; Kuiken and Vedder, 2002; Kowal and Swain, 1994, among many). Nassaji and Tian(2010) compared effects of collaborative and individual performance of two types of output tasks: reconstruction cloze and reconstruction editing on learning English phrasal verbs. Twenty six subjects took part in this study and they performed tasks under both individual and collaborative (paired) conditions; they worked on each task two times once individually, the other time collaboratively. Result showed that collaborative completion of tasks led to greater accuracy than individual completion of them. However no significant difference was found in gains of vocabulary knowledge between collaborative and individual tasks. Kowal and Swain (1994) studied effect of collaborative performance of dictoglass among intermediate and advanced French learners. They found out that learners' attention is drawn to form-meaning gap when they work together and receive feedback. Their study was replicated by Nabei(1996). She also found that collaboration increased attention to form, scaffolding and feedback among learners. Storch (2005) in a study compared written texts produced by learners collaboratively and individually in terms of accuracy, fluency and complexity. It was found that collaborative writing resulted in more accurate and complex texts than individual writing, although the difference was not significant. In another study Storch(2007) investigated effect of collaboration on editing task. Learners were asked to correct a short written text which contained some errors such as verbs, articles, word forms one group in pairs another individually. It was observed that interaction and reflection on language forms in the paired group was higher than in individual group. However the accuracy rate between two groups was not significant. It was argued that the reason for this was partly due to the nature of errors to be corrected. Recently Nassaji and Tian (2010) have studied effects of collaborative and individual performance of editing and cloze tasks on retention of phrasal verbs. Data analyzed for actual gain of vocabulary knowledge showed that while collaborative or individual performance of tasks doesn't make any significant difference in vocabulary learning, task type was proved to be effective. Editing task was significantly more effective than cloze task in vocabulary retention.

Another area of research which has recently received attention is the degree of engagement with vocabulary. The idea originally comes from depth/levels of processing hypothesis of Criak and Lockhart (1972) that the more the attention given to an item, and the more manipulation involved with the item, the greater the chances it will be remembered; in other words, the chance of storing new information in the long-term memory depends on the deepness or shallowness of processing. Based on depth/levels of processing hypothesis (Criak and Lockhart (1972), Hulstijn and Laufer (2001) introduced Involvement Load hypothesis. They identified three components for vocabulary involvement: need, search and evaluation. Need is the requirement for a specific word in order to perform a task. Search is the attempt made for looking up a word. Evaluation refers to comparison of a word with other words, or comparison of different meanings of a word to see if the word suits its context. Hulstijn and Laufer (2001) suggested that the more the involvement with a word, the greater the chances of learning that word. To test their hypothesis they studied effect of three tasks: reading comprehension, reading comprehension with fill-in-the-blank, and composition writing with varying degree of involvement on word retention in short and long term. As predicted, the task with the highest involvement load, writing composition task in their study, resulted in the highest amount of retention. In another study, Keating (2008) replicated the study of Hulstijn and Laufer (2001) with learners of Spanish and obtained the same result. Results of these studies show that tasks inducing higher involvement lead to higher amount of retention, giving credit to Involvement Load Hypothesis. However one of the factors which is not taken into account in their hypothesis is the amount of time spent on different types of tasks, the point put out by False (2006). Hulstijn and Laufer (2001) consider difference in time as inherent to tasks. As we know the amount of time spent for performing different tasks is differential. Writing a composition, for instance, can take twice time as much as filling in the blank. To account for time factor, Folse(2006) conducted a study using three types of exercise: one-fill-in-the-blank, three fill-in-the-the-blank and writing original sentences. He used three-fill-in-the-blank exercise in his study in order to make time spent on it equal to writing original sentence while keeping exercise type different. Result of his study showed that retention for three-fill-in-the-blank exercise was higher than that of writing original sentence exercise which was higher than one-fill-in-the-blank exercise. Based on the result of his study, False (2006) concluded that the important feature in L2 vocabulary exercise is the number of word retrievals required not the depth of processing which is against involvement load hypothesis. However, since

then, no studies, to our knowledge, have been done to test ILH using different exercise types by taking time factor into consideration. Our study is replication and completion of Folse's (2006). Folse used only immediate post-test in his study, one doubts that the same result can hold for the long term too. Interaction between exercise type and collaboration is also one of the issues in need of research.

To investigate the effects of collaborative and individual performance of writing original sentence exercise and two-fill-in-the-blank exercises on vocabulary retention in both immediate and delayed post-test conditions the following questions were put:

1. What are the effects of writing original sentence and two-fill-in-the-blank exercises on the vocabulary retention in short and long terms?
2. Does collaborative and individual performance of writing original sentence and two-fill-in-the-blank exercises have any effects on vocabulary retention in short and long terms?

3. The Study

3.1. Participants

Participants in this study were three intact groups of intermediate- level Persian learners of English studying English as a foreign language in a Language institute in Iran. 27 students took part in this study; there were 10 learners in two of the groups and 7 in the other. All of them were senior high school students, except for one of them who was junior. Their age ranged between 14 and 18. They had started learning English two years ago and had not stopped it since then. All of them had the same native language and had been assigned to the classes based on their previous term grades. However, to be sure that they are at the same level of proficiency, Oxford Placement Test2 was administered. Their responses were scored on a scale of 100 points. The range of their score was between 46 and 57 which show that they are of about the same proficiency level. They attended the classes twice a week for 20 sessions each term. At the time of the study they were in the middle of the term.

3.2. Target words

Actual target words selected for this study included 8 English verbs. However to avoid guessing factor, we added 4 extra words to the actual words. All the verbs had to be unknown to the learners. Therefore their familiarity was tested by another group of the same proficiency level who were not supposed to take the actual test. All the verbs proved to be unfamiliar. Also during the test students were asked to mark the words they already knew, if there was any. Only one of the subjects stated that he knew one of the words. Thus this student was excluded from the study, although he took the test. Since all subjects had to practice the entire target words we didn't take the difficulty level of them into consideration. However to eliminate effects of word form, all the selected words were verb.

3.3. Research Design and Procedure

The study included a pretest, treatment, an immediate post-test and a four-day delay posttest. Within-subject research design was used to account for individual differences. Students performed both writing original sentence and two-fill-in-the-blank exercises under two conditions: both individually and collaboratively (in pairs). In other words each subject did four exercises: writing original sentence one individually and one collaboratively, a two-fill-in-the-blank exercise one individually and one collaboratively. In writing original sentence exercise students were asked to write an original sentence using the word. Two-fill-in-the-blank exercises included two different blank exercises to be filled by the same word.

A mini-dictionary of three words was prepared for each exercise type; four mini-dictionaries for four exercise types. Mini dictionaries included definition of each word as well as illustrative examples of it. Target words were printed in bold type. We used Longman, Oxford and Cambridge dictionaries for definition of words and we tried to

keep the definitions as simple as possible. Examples provided for words as well as the sentences that were used in fill-in-the-blank exercises were all authentic being selected from the above mentioned dictionaries and Corpus of Contemporary American English database at http://corpus.byu.edu/coca/.

Students were given the mini-dictionary related to each exercise type and as well as the exercise to do. They had to study the mini-dictionary and do the exercise. Each exercise was practiced separately, with 15 minutes for each one. The time was set by asking two students who were at the same proficiency level as the target group to do the exercises.

The reason for using two-fill-in-the-blank exercise rather than one-fill-in-the-blank was that writing original sentence exercise would take considerably more time than a fill-in-the-blank exercise. Since the amount of time spent on performing exercise can affect their retention, we tried to keep time factor constant over exercises.

3.4. Data Collection

To control memory effect the data were collected in one session. Each class was randomly divided into half forming two groups. One group worked in pairs and the other individually. The classes of 8 students, for instance, formed four individual and two pair workers. Each group received two types of exercises, one after another. Then the order of the groups was changed; Individual group worked in pairs and pairs individually and each group again received two types of exercises one after another. The order of the exercises counterbalanced. Immediately after collecting the mini-dictionaries and practice booklets, the first post-test was administered. Because we wanted to test implicit vocabulary learning, students were not allowed to know that there was a test after practicing the words. The same condition was held for the second post-test. Post-test included the eight main words; two words were randomly selected out of three practiced words in each exercise type. Student had thirty minutes to do it. Therefore the treatment and the first post-test took about ninety minutes.

4. Tests and Scoring

The test used in this study for measuring knowledge of idiom was the modified version of vocabulary knowledge scale (VKS; Paribakht & Wesche, 1997) adopted by False (2006). This modified version has three levels of word knowledge: Zero point for lack of knowledge, one point for providing correct meaning which can be in the form of acceptable English synonym, English definition, L1 translation, or L1 definition, and one extra point for providing an example sentence. Therefore each idiom could receive 0, 1 or 2.

5. Data analysis

Students' performance on writing original sentence and fill-in-the-blank exercises under collaborative and individual conditions was compared using repeated measure ANOVA by SPSS 16. Mean and standard deviation for each condition and exercise type are shown in table 1.

Analysis showed that the main effect for exercise type (sentence writing vs. fill-in-the-blank) was not significant, F (1,26) = 0.156, p =0.696. ANOVA also showed that main effect for exercise condition (Collaborative vs. Individual) was not significant, F (1,26) = 0.487, p= 0.497, nor for interaction between exercise type and condition F(1,26) = 0.437,p = 0.514. Result showed that collaborative sentence writing was slightly more effective than individual sentence writing, but individual fill-in-the-blank was more effective than collaborative fill-in-the-blank.

Table 1. Mean and standard deviations of exercises in the immediate post-test

	M	SD
Individual		
Sentence Writing	2.00	1.56
Fill-in-the-blank	2.03	1.84
Collaborative		
Sentence Writing	2.29	1.81
Fill-in-the-blank	1.92	1.81

Learners' performance on the delayed post-test was also analysed using Repeated measure ANOVA. Mean and standard deviation for condition and exercise type are summarised in table2. Data analysis showed that main effect for exercise type (sentence writing vs. fill-in-the-blank) was not significant, $F(1,19) = 0.160$, $p = 0.694$, nor for condition (collaborative vs. individual), $F(1,19)= 2.25$, $p = 0.15$. However interaction between condition and exercise type was found to be significant, $F(1, 19) = 4.44$, $p \leq 0.05$.

Table 2. Mean and standard deviations of exercises in the delayed post-test

	M	SD
Individual		
Sentence Writing	1.40	1.27
Fill-in-the-blank	1.70	1.71
Collaborative		
Sentence Writing	1.85	1.53
Fill-in-the-blank	0.95	1.14

6. Discussion

Analyzing learners' performance both in the immediate and delayed post-test showed that there is no significant difference in vocabulary gain between writing original sentence and two-fill-in-the-blank exercises. This is against the predictions of Involvement Load Hypothesis. According to this hypothesis retention of a word is associated with degree of engagement; the more the engagement, the higher the rate of retention. Hulstijn & Laufer (2001) identify three factors for rating activities' level of involvement including: a. need b. search c. evaluation. Based on their criteria writing original sentence generates high need, medium search and high evaluation while fill-in-the-blank exercise generates high need, medium search and medium evaluation. Therefore original sentence writing involves students more than the two-fill-in-the- blank exercises; Generating deeper processing than two- fill-in-the-blank. Although they admit that determining level of processing is a difficult task and many factors are involved. Then, based on these assumptions, one expected learners' performance at sentence writing to be better than fill-in-the-blank exercise.

One reason for this can be number of word retrievals that fill-in-the-blank exercises provided. In this study, students' chance of word encounter in the fill-in-the-blank was twice as much as in writing original sentences. Effect of number of word encounters on its retention is shown in psycholinguistics (Baddeley, 1990; Atkins & baddeley, 1998) and second language learning (Folse, 2006). Therefore it can be argued that superficiality of the level of processing in fill-in-the-blank exercises can be compensated by number of word encounters. So it can be said that fill-in-the-blank exercises can be as productive, if not more, as deep processing, high involvement load exercises as writing original sentences, given the equal amount of time.

Another reason for this can be attributed to time-on-task, time spent over each task. Almost all previous studies on ILH (Hulstijn & Laufer. 2001; Laufer & Hulstijn, 2001; Keating,) have eliminated time-on-task from their analysis. Hulstijn & Laufer (2001), for instance, regard it as inherent to each task. It is obvious that a task like writing original sentence task can take about twice as much time as a fill-in-the-blank (both used in literature). The only study that has taken time- on- task factor into consideration is Folse (2006). Therefore in these studies, as Folse (2006) points out, it is not clear that whether difference in performance is due to nature of tasks in terms of levels of processing or amount of time spent on them. To account for time factor, following Folse (2006), we included two fill-in-the-blank exercises in the practice booklet which took roughly the same amount of time as the writing task. The result of this study in compliance with Folse implies that when equal time is spent over vocabulary learning, result of the retention is the same regardless of type of exercise. However the role of time as a determining factor in word retention requires extensive research.

For the role of collaboration, the result showed that in the immediate testing situation, collaborative and individual performance of exercises does not make any difference. Therefore results of the study in the immediate post-test is in line with other studies(Swain & Lapkin, 2001; Storch, 2005, 2007; Kuiken & Vedder,2002; Nassaji & Tian, 2010) which showed no significant effect for collaborative performance of tasks. There are several reasons for this.

One reason might be the learners' lacking in collaboration skills. Sometimes learners cannot collaborate with each other simply because they don’t know how. Previous studies (Berg, 1999) have shown that building collaboration skills before performing collaborative tasks can significantly promote their performance. Other factors that might have effects on collaborative tasks include learners' learning style and strategies (for details see Chamot & O'Malley, 1987), their cognitive and developmental readiness (Nassaji & Cumming, 2000; Leeser, 2004) beliefs.

The other reason may be the nature of target forms. Vocabulary might not provide much opportunity for collaboration. It is possible that the effect of collaboration vary as the target form varies for example from vocabulary to different components of writing. Further research is required to compare the effect of collaboration on different aspects of language.

Result for collaboration in the delayed post-test showed that collaborative sentence writing was slightly more effective than individual sentence writing, but individual fill-in-the-blank was more effective than collaborative fill-in-the-blank, although the difference between them was not significant.

Interesting result was obtained for interaction between exercise type and collaboration. Individual fill-in-the-blank was almost as effective as individual and collaborative sentence writing; it was more effective than individual sentence writing and less effective than collaborative writing. But vocabulary gain for collaborative fill-in-the-blank was found to be significantly less than collaborative sentence writing. It was also considerably less than individual sentence writing, although not significantly. In other words, individual fill-in-the-blank can be as effective as collaborative sentence writing exercise.Therefore collaboration doesn’t always lead to improvement in performance, but its effect depends on the type of exercise. It seems that while collaboration is beneficial for exercises like writing original sentence which require deep processing, individual performance seems to be beneficial for exercises like

fill-in-the-blank that generate shallow processing. However more research is required to examine the effect of collaboration on different types of exercises.

In sum, the study showed that exercise type doesn't have any effect on vocabulary retention both in short and long terms when time spent on them is kept constant. Effect of collaboration (individual and collaborative) in the short-term was not significant. However in the long term, different exercises showed different results. Individual fill-in-the-blank proved to be as effective as collaborative writing.

7. Conclusion

In this study we investigated the effect of collaborative and individual performance of two types of exercises: fill-in-the-blank and writing original sentence on vocabulary retention in both the immediate and delayed post-test conditions. It was shown that exercise type doesn't make any difference in vocabulary retention in both immediate and delayed test conditions. Collaborative and individual exercise completion didn't have any effect on vocabulary retention in immediate test situation. In the delayed post-test (long- run) collaboration worked only for writing exercise, while individualization for fill-in-the-blank. Therefore it can be said that it is the nature of a task that determines which condition (individual or collaborative) to be employed for its performance. Further research is required to study the effect of collaborative and individual conditions on other exercise types as well as those which are studied here both in short and long term. We studied the effect of these exercises and conditions using productive tests. Future studies can add recognition tests for their evaluation.

The implication of this study for English teachers is that not any activity associated with collaboration means better performance, rather they should make informed decision based on the nature of exercises. In other words when writing exercises are concerned, teachers should encourage collaboration while for fill-in-the-blank exercises individual work can be more beneficial than collaborative work.

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